first embodiment, advantages that no positional deviation occurs between the chip 5 and the contact film 3, the reliability is high, and it is assembled easily.

Although in the second embodiment the projection 7c is formed on the surface of the outer lid 7 to be opposed to the inner lid 8, the same advantages as in the second embodiment can also be obtained by forming a projection on the surface of the inner lid 8 to be opposed to the outer lid 7.

Third Embodiment

A third embodiment of the invention will be hereinafter described in detail with reference to the drawings. Fig. 6 is a schematic perspective view showing how a chip carrier according to the third embodiment is assembled. In Fig. 6, reference symbol 1 denotes a carrier base; 4a denotes an opening; 4e denotes erect portions of the carrier base 1; 4f denotes projections of the respective erect portions 4e; 5 denotes a chip; 7 denotes an outer lid; 7a denotes side surfaces of the outer lid 7; 7b denotes recesses formed in the respective side surfaces 7a; and 8 denotes an inner lid.

The chip 5 is approximately square and, to conform to this chip shape, the carrier base 1, the opening 4a, the inner lid 8, and the outer lid 7 are also made approximately square. The erect portions 4e of the carrier base 1 are formed around the opening 4a at the four corners. The inner surfaces of the erect portions 4e are formed with respective projections 4f.

The side surfaces 7a of the outer lid 7 are formed with the respective recesses 7b. The outer lid 7 is so formed as to be slightly smaller than the carrier base 1 so as not contact the erect portions 4e when engaged with the carrier base 1 through rotation, which will be described later. Further, the outer lid 7 is formed with cuts at parts of side surface 7a close to the respective recesses 7b.

In the chip carrier having the above structure, the chip 5 is mounted on the contact film 3 in the opening 4a as in the case of the first embodiment. Then, the inner lid 8 is mounted on the chip 5 so as to be fitted into the opening 4a. Then, the outer lid 7 is rotated in the direction indicated by arrows in Fig. 6 and thereby engaged with the carrier base 1.

As described above, in the chip carrier 1 according to the third embodiment for the square chip 5, to make its shape similar to the chip 5, that is, square, the four erect portions 4e are provided around the opening 4a to enable balanced engagement instead of forming the erect portions 4b having the arc-shaped side surfaces 4d as in the case of the first embodiment.

As described above, as in the case of the first embodiment, the third embodiment can provide a chip carrier that is composed of only a small number of parts and has a simple mechanism and in which the assembling can be automated easily, no positional deviation occurs between the chip 5 and the contact film 3, and the test efficiency is high. In particular, the chip carrier according to the third embodiment is suitable for the CSP and the like.

In the third embodiment, the four erect portions 4e which are provided around the opening 4a of the carrier base 1 are engaged with the four respective recesses 7b of the outer lid 7. The same advantages as in the third embodiment can also be obtained in such a manner that three erect portions 4e are formed around the opening 4a approximately at regular intervals, three recesses 7b are formed in the side surfaces 7a of the outer lid 7 so as to correspond to the respective erect portions 4e, and erect portions 4e are engaged with the respective recesses 7b.

In the third embodiment, the recesses 7b are formed in the outer lid 7, the projections 4f are formed on the carrier

base 1, and the projections 4b are engaged with the recesses 7b. Conversely, the same advantages as in the third embodiment can also be obtained in such a manner that projections are formed on the outer lid 7, recesses are formed in the carrier base 1, and the projections are engaged with the recesses.

Although in the third embodiment the chip 5 etc. are approximately square, the shapes of the chip 5 etc. are not limited to such shapes. The same advantages as in the third embodiment can also be obtained even if the chip 5 etc. have other shapes such as rectangles.

The features and advantages of the present invention may be summarized as follows. The invention can provide a chip carrier that is composed of only a small number of parts, has a relatively simple mechanism, and is inexpensive. Further, the invention can provide a chip carrier that is highly reliable without any displacement of a chip during assembling, is assembled easily, and facilitates automation of assembling, as well as a method of testing a chip using the chip carrier. Still further, the invention can provide a compact chip carrier that facilitates sharing of test equipment for semiconductor devices and provides high test efficiency, as well as a method of testing a chip using the chip carrier.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may by practiced otherwise than as specifically described.

The entire disclosure of a Japanese Patent Application No. 2001-134036, filed on May 1, 2001 including specification, claims, drawings and summary, on which the Convention priority